CASE REPORT OPEN ACCESS

Iatrogenic Pneumoperitoneum Following Peritoneal Dialysis in A Neonate with Methylmalonic Acidemia: A Rare Case Report

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ABSTRACT

This is a case of a neonate who was brought to the hospital at 46 hours of life with symptoms of fatigue, difficulty breathing and hypoglycemia for the past 6 hours. His septic workup was normal; however, labs were consistent with high anion gap metabolic acidosis, hyperammonemia, and urine positive for methylmalonic acid. Due to persistent encephalopathy and high ammonia levels, he was intubated, and peritoneal dialysis (PD) was started. On day 3 of PD drain placement, the baby developed abdominal distension. Abdominal x-ray showed a football sign indicative of pneumoperitoneum. Tube feeding was started with special formula milk. The neonate showed clinical improvement and was discharged on the 11th day of life.

Keywords: Methylmalonic Acidemia, Pneumoperitoneum, Peritoneal Dialysis.

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INTRODUCTION

Methylmalonic acidemia (MMA) is a genetically transmitted metabolic disorder arising from impaired metabolism of specific amino acids, odd-chain fatty acids, and/or cholesterol esters[1] . Its clinical course could vary from mild symptoms to severe disease[2]. Hyperammonemia is a common complication in MMA patients and is usually managed by peritoneal dialysis[3]. Iatrogenic pneumoperitoneum is a very rare complication of peritoneal dialysis, and there is little data available on its management.

This is the case of a neonate with methylmalonic acidemia who underwent peritoneal dialysis and developed iatrogenic pneumoperitoneum during hospital stay.

CASE PRESENTATION

A neonate presented to the hospital at 46 hours of life with symptoms of fatigue and difficulty breathing for the past 6 hours. His mother (G4P3) was healthy and had a normal antenatal course. Antenatal scans showed no anomaly, all viral markers were negative, and urine culture results were also normal. However, consanguinity was present with 2 alive siblings, both of whom were healthy. The patient was born via spontaneous vaginal delivery at 37 weeks of gestation with normal APGAR scores and a

birth weight of 2.8 kg. After examination in the nursery, the baby was shifted to the mother's side within 6 hours.

At the 40th hour of life, the parents complained that the baby appeared lethargic and had difficulty in feeding. He was immediately taken to the nursery, where he was found to be vitally stable but dull-looking in appearance with poor activity and reflexes. The rest of the systemic examination was unremarkable. However, he was found to be thrombocytopenic and hypoglycemic. Hypoglycemia was corrected, and septic workup was initiated. However, due to the persistence of symptoms, the baby was shifted to NICU for further evaluation and management. Based on history and examination, an initial differential diagnosis of early onset sepsis or inborn error of metabolism was made. Laboratory workup showed high anion gap metabolic acidosis (lactic acid levels of 11.1 mmol/l), hyperammonemia (435 µmol/l), and positive urine ketones. Septic markers were unremarkable. Considering the development of respiratory distress after 24 hours of life and the above-mentioned laboratory findings, a diagnosis of organic acidemia was made. The metabolic team was taken on board and workup, including acylcarnitine, plasma amino acids, and urine for organic acids, was sent. L-carnitine, 1.5 times maintenance fluids, and per oral metronidazole were started. Urine for organic acid showed the presence of methylmalonic acid consistent with methylmalonic aciduria.

Due to persistent encephalopathy and raised ammonia levels, the patient was intubated, and a peritoneal dialysis (PD) drain was placed. Dialysis was performed for the next two days. Insulin infusion was started for raised sugar levels and then gradually tapered off on merit. The patient was successfully extubated after about 48 hours. Throughout this period, the baby was kept nil per oral. On 3rd day after the PD drain placement, the baby developed abdominal distension. Gut sounds were audible, bowel movements were intact, and the peritoneal drain output was not soiled with stool. The abdominal radiograph showed a football sign consistent with pneumoperitoneum **Figure 1**.

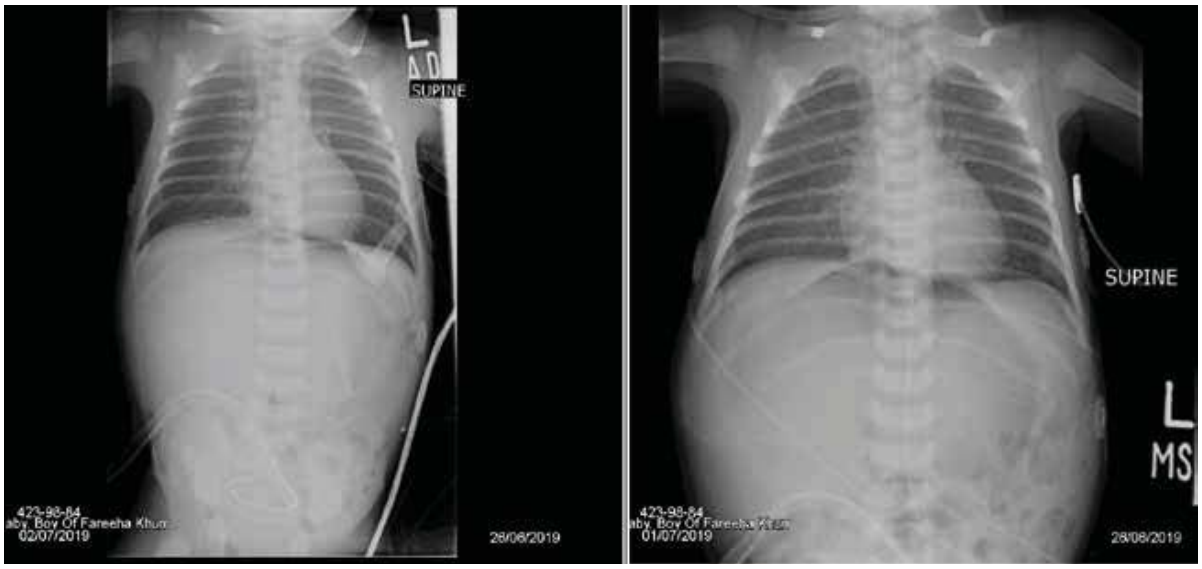

Figure 1: Abdominal X-ray Showing Football Sign

After a thorough discussion, the decision was made to start tube feeding with special formula milk, which was well-tolerated and gradually progressed to the target. The baby improved clinically, and serial x-rays were performed, which showed a resolving pattern of pneumoperitoneum. Therefore, he was successfully discharged on the 11th day of life with a planned clinic follow-up for metabolic and neonatology teams.

DISCUSSION

MMA is a rare inherited metabolic disorder that causes multisystem injury, particularly to the central nervous system[4]. It has detection rates that vary across regions. The estimated detection rates per 100,000 newborns are 0.79 (CI: 0.44–1.21) in Asia-Pacific, 1.12 (CI: 0.50–1.91) in Europe, 1.22 (CI: 0.61–2.01) in North America, and 6.04 (CI: 4.02–8.41) in the Middle East and North Africa (MENA), where prevalence is highest[5]. Though the incidence is low, the mortality rates associated with MMA are very high. The reported mortality was 60-88% in the 1980s when the disease was initially reported, and the rates have now somewhat improved to 40% but this is still a high number[6].

A few cases of MMA have also been documented in Pakistan. A study conducted at Military Hospital, Rawalpindi, reported a case of a 2-year-old boy with MMA who experienced developmental delays[5]. Additionally, a cross-sectional study at Aga Khan University Hospital, Karachi, from January 2013 to April 2016, examined 1,778 pediatric patients and identified 50 cases (2.81%) of methylmalonic acidurias. Among these cases, 20 (48.7%) were females, and the overall median age was 11.5 months (interquartile range: 6–41.5 months)[6]. Our case report identified MMA at few days of life, younger than the age at diagnosis reported in previous studies from Pakistan. However, studies fro m other countries have reported MMA in neonates[7].

Recurrent, life-threatening metabolic decompensations often occur in patients with methylmalonic aciduria. Several therapeutic modalities, including exchange transfusions, peritoneal dialysis, and continuous hemofiltration, have been utilized in neonates with MMA[8,9,10].

This case report presented a case of MMA with iatrogenic pneumoperitoneum as a complication of PD drain placement. Pneumoperitoneum following PD is often due to unintentional perforation or air leakage during catheter placement. However, in this case, the absence of fecal contamination or peritonitis suggests a different etiology, possibly related to air trapping during dialysis exchanges. To the best of authors' knowledge, no such case of methylmalonic acidemia treated with peritoneal dialysis had iatrogenic pneumoperitoneum as a complication. The findings from this case report recommend not withholding feeding if such a complication is encountered after ruling out all the other causes of pneumoperitoneum.

CONCLUSION

This case highlights the importance of reassessing feeding strategies in neonates with MMA who develop iatrogenic pneumoperitoneum post-PD. This experience suggests that tube feeding can be safely resumed after ruling out other causes, such as bowel perforation.

LIST OF ABBREVIATIONS

MMA: Methylmalonic acidemia
PD: Peritoneal dialysis
APGAR: Appearance, Pulse, Grimace, Activity, and Respiration
NICU: neonatal intensive care unit
MENA: Middle East and North Africa.

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None

CONFLICT OF INTEREST

The authors declared no conflict of interest.

PATIENT CONSENT

Consent of the guardian was taken before the writing of the manuscript.

AUTHORS' CONTRIBUTIONS

FTB:AM conceptualized the study; FTB and MBH conducted the literature review; FTB: MBH and IM gathered the data for the manuscript; FTB, AM, MBH, and IM took part in manuscript writing; all authors thoroughly reviewed the manuscript before submission.

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